

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 11 February 2000 (11.02.00)	
International application No. PCT/US98/14054	Applicant's or agent's file reference DN1998090
International filing date (day/month/year) 07 July 1998 (07.07.98)	Priority date (day/month/year)
Applicant ROESGEN, Alain, Emile, François	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

09 December 1999 (09.12.99)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Jean-Marc Vivet Telephone No.: (41-22) 338.83.38
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## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>DN1998090</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/US 98/ 14054</b>	International filing date (day/month/year) <b>07/07/1998</b>	(Earliest) Priority Date (day/month/year)
Applicant <b>THE GOODYEAR TIRE &amp; RUBBER COMPANY et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (see Box I).

2. ☐ Unity of invention is lacking (see Box II).

3. ☐ The international application contains disclosure of a **nucleotide and/or amino acid sequence listing** and the international search was carried out on the basis of the sequence listing

☐ filed with the international application.

☐ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ Transcribed by this Authority

4. With regard to the title, ☒ the text is approved as submitted by the applicant

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International Search Report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is:

Figure No. 3 ☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/14054

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B60C17/00 B60C9/18 B60C9/22 B29D30/08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B60C B29D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 778 164 A (BRIDGESTONE CORP) 11 June 1997	1,3, 10-12
Y	see page 2, line 40 - page 3, line 11; claim 1; figures	1-6,8-14
Y	US 4 262 726 A (WELTER THOMAS N H) 21 April 1981 cited in the application see column 1, line 64 - column 2, line 62; claims; figures	1-6,8-14
X	US 4 269 646 A (MILLER RICKIE L ET AL) 26 May 1981 see claims	17
A	US 4 111 249 A (MARKOW EDWARD G) 5 September 1978 cited in the application	1-10
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

25 February 1999

Date of mailing of the international search report

03/03/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Baradat, J-L

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/14054

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 88 08373 A (GRUMMAN AEROSPACE CORP) 3 November 1988 ---	1-10
A	EP 0 605 177 A (BRIDGESTONE CORP) 6 July 1994 see claims -----	1, 15

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/14054

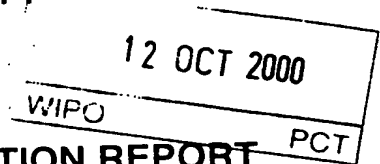
Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 0778164	A	11-06-1997	WO	9701452 A	16-01-1997
US 4262726	A	21-04-1981	EP	0016114 A	01-10-1980
			JP	55500744 T	09-10-1980
			WO	8000069 A	24-01-1980
US 4269646	A	26-05-1981	AU	514919 B	05-03-1981
			AU	3371678 A	06-09-1979
			BR	7801630 A	24-10-1978
			CA	1082863 A	05-08-1980
			DE	2813702 A	12-10-1978
			FR	2385518 A	27-10-1978
			GB	1601100 A	21-10-1981
			LU	79245 A	29-06-1978
US 4111249	A	05-09-1978	NONE		
WO 8808373	A	03-11-1988	US	4794966 A	03-01-1989
			EP	0310650 A	12-04-1989
EP 0605177	A	06-07-1994	JP	6191243 A	12-07-1994
			AU	653112 B	15-09-1994
			AU	5235693 A	14-07-1994
			DE	69308280 D	03-04-1997
			DE	69308280 T	17-07-1997
			ES	2100480 T	16-06-1997
			US	5427176 A	27-06-1995

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)





Applicant's or agent's file reference <b>DN1998090</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/US98/14054</b>	International filing date (day/month/year) <b>07/07/1998</b>	Priority date (day/month/year) <b>[07/07/1998]</b>
International Patent Classification (IPC) or national classification and IPC <b>B60C17/00</b>		
Applicant <b>THE GOODYEAR TIRE &amp; RUBBER COMPANY et al.</b>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.  
  
☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand  <b>09/12/1999</b>	Date of completion of this report  <b>10. 10. 00</b>
Name and mailing address of the international preliminary examining authority:   <b>European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465</b>	Authorized officer  <b>Kieslinger, J</b>  Telephone No. +49 89 2399 8871  

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US98/14054

## I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

### Description, pages:

1-3,5-38	as originally filed			
4,4a	as received on	27/07/2000	with letter of	10/07/2000

### Claims, No.:

1-12	as received on	27/07/2000	with letter of	10/07/2000
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### Drawings, sheets:

1/9-9/9	as originally filed
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2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

## IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.
- ☐ paid additional fees under protest.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/US98/14054

☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

☐ complied with.

☒ not complied with for the following reasons:

**see separate sheet**

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

☒ all parts.

☐ the parts relating to claims Nos. .

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims	2,4,5,7-12
	No:	Claims	1,3,6
Inventive step (IS)	Yes:	Claims	10-12
	No:	Claims	1-9
Industrial applicability (IA)	Yes:	Claims	1-12
	No:	Claims	

**2. Citations and explanations**

**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**s s parate sheet**



#### REF. ITEM IV

The subject-matter of independent claim 1 is already known (see the grounds for this objection). The requisite unity of invention (Rule 13.1 PCT) therefore no longer exists inasmuch as a technical relationship involving one or more of the same or corresponding special technical features in the sense of Rule 13.2 PCT does not exist between the subject-matter of the following groups of claims:

- a) Claims 1 to 6, 8 and 9 (angle of 0 to **20 degrees**, known from D1)
- b) Claims 7 and 10 to 12 (angle of 0 to **5 degrees**).

#### REF. ITEM V

##### V.1. Prior art

Reference is made to the following documents:

- D1: EP-A-0 778 164 (BRIDGESTONE CORP) 11 June 1997
- D2: US-A-4 262 726 (WELTER THOMAS N H) 21 April 1981 cited in the application
- D3: US-A-4 269 646 (MILLER RICKIE L ET AL) 26 May 1981
- D4: US-A-4 111 249 (MARKOW EDWARD G) 5 September 1978 cited in the application
- D5: WO 88 08373 A (GRUMMAN AEROSPACE CORP) 3 November 1988
- D6: EP-A-0 605 177 (BRIDGESTONE CORP) 6 July 1994

##### V.2. Independent claim 1

Document D1 is considered to represent the most relevant state of the art. According to page 3, lines 9 and 49 and the table between lines 40 and 52 on page 4 (example 1) D1 discloses a tire comprising all features of claim 1.

It is true that D1 teaches **preferably** an angle (of the reinforcing cords with respect to the equatorial plane) of greater than or equal to 30° and optimally in a range of 45 to 75°, however, D1 discloses according to its example 1 also an angle of **20°, i.e. an angle in**

**the claimed range of 0 to 20 degrees.**

Thus the subject-matter of claim 1 lacks novelty as required by Article 33 (2) PCT.

### **V.3. Dependent claims 2 to 9**

Dependent claims 2 to 9 do not appear to contain features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty or inventive step. These claims suggest only slight changes in the tire of claim 1, which - with regard to D1 to D6 - comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Consequently, the subject-matter of dependent claims 2 to 9 also lacks at least an inventive step.

### **V.4. Independent claim 10**

Document D1, which is considered to represent the most relevant state of the art, discloses (cf. Fig. 1 and text) a method, from which the subject-matter of claim 10 differs in that

- i) the completed green tire is blown up in a curing mold to prestress the reinforcing cords of the fabric underlay (i.e. feature d) of claim 10), and
- ii) the angle of the reinforcing cords with respect to the equatorial plane is **about 0 to about 5 degrees.**

The problem to be solved by the present invention may be regarded as to improve high speed characteristics.

It is true that the feature i) of claim 10 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT), since this feature i) is described in document D2 (see e.g. col. 3, lines 52, 53 and col. 4, lines 20 to 35) as providing the same advantages as in the present application. The skilled person would therefore regard it as a normal option to include this feature in the method known from document D1 in order to solve the problem posed.

However, the combination of all features including feature ii) of independent claim 10 is neither known from, nor rendered obvious by, the available prior art.

Therefore, the solution to the above mentioned problem proposed in claim 10 of the present application is considered as involving an inventive step (Article 33(3) PCT).

#### **V.5. Dependent claims 11 and 12**

Claims 11 and 12 are dependent on claim 10 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

#### **REF. ITEM VIII**

VIII.1. The vague and imprecise statement **"...within the spirit...."** in the description on page 38 implies that the subject-matter for which protection is sought may be different to that defined by the claims, thereby resulting in lack of clarity (Article 6 PCT) when used to interpret them (see also the PCT Guidelines, III-4.3a).

**What is claimed:**

1. A pneumatic radial ply runflat tire (10) having a tread (12), a carcass (25) with two sidewalls (18,19) and two inextensible annular beads (26) and a radial ply structure (37) of one or more radial plies (38,40) and one or more inserts (46,48), and a belt structure (16) located between the tread and the radial ply structure, the runflat tire characterized by:

a fabric underlay (60) deployed between the belt structure (16) and the radial ply structure (37) for supporting tensile loads during both normal-inflated and runflat operating conditions, the fabric underlay containing high-modulus reinforcing cords (62) being aligned about 0 degrees to about 30 degrees with respect to the equatorial plane of the tire.

2. The tire (10) of claim 1 in which the fabric underlay (60) is disposed radially inward of the belt structure (16) and having opposing marginal edges (27,28) which extend laterally beyond lateral edges of the belt structure.

3. The tire (10) of claim 1 in which the high-modulus reinforcing cords (62) of the fabric underlay (60) are made of high-modulus material selected from the group consisting essentially of polyester, nylon, rayon, aramid and glass.

4. The tire (10) of claim 1 in which the fabric underlay (60) is located on the tensile side of the neutral bending axis of the combined belt structure (16), fabric underlay (60) and ply structure (37).

REPLACED BY  
ART 34 AMDT

5. The tire (10) of claim 4 in which the fabric underlay (60) contributes circumferential and meridional stiffness to the tread (12) and the combined underlying belt structure (16) and ply structure (37).

5 6. The tire (10) of claim 5 in which the fabric underlay (60) induces compressive stresses in the portion of the belt structure that underlies the flattened ground-contacting portion of the tread (12) during normal inflated operation of the tire.

10 7. The tire (10) of claim 4 in which the circumferentially oriented cords (62) of the fabric underlay (60) are prestressed in tension during manufacturing of the tire.

15 8. The tire (10) of claim 7 in which the prestressed circumferentially oriented cords (62) of the fabric underlay (60) are disposed to inhibit the formation of standing waves in the tread (12) during high speed operation under normal inflation pressure.

20 9. The tire (10) of claim 8 in which the prestressed circumferentially oriented cords (62) of the fabric underlay (60) are disposed to inhibit circumferential buckling of the tread (12) during runflat operation.

25 10. The tire (10) of claim 1 in which the fabric underlay (60) separates the belt structure (16) from the ply structure (37).

11. The tire (10) of claim 10 in which the fabric underlay (60) increases both the meridional and circumferential moment of inertia of the combined belt

REPLACED BY  
ART 31.1

structure (16), fabric underlay (60) and ply structure (37) underlying the tread (12).

12. The tire (10) of claim 11 in which the fabric underlay (60) is disposed to inhibit meridional and circumferential tread buckling during runflat operation.

13. The tire (10) of claim 9 in which the prestressed circumferentially oriented cords (62) of the fabric underlay (60) distribute the tire load across large areas of the reinforced sidewalls (18,19) of the tire during runflat operation.

14. The tire (10) of claim 1 in which the reinforcing cords (62) of the fabric underlay (60) are oriented at an angle of between about 0 degrees and about 30 degrees, preferably between about 0 degrees and 20 degrees, and most preferably about 8 degrees with respect to the equatorial plane of the tire.

15. The tire (10) of claim 1 in which a fabric overlay (540) is disposed between the belt structure (16) and the tread (12).

16. The tire (10) of claim 1 wherein at least one or more of radial plies (30,40) is reinforced by essentially inextensible cords.

17. A method of constructing a radial ply runflat tire (10) by the steps of:

- a) forming a blown-up green tire carcass (25);
- b) circumferentially wrapping a ribbon of cord-reinforced elastomeric material upon the blown-up green tire carcass to form the fabric underlay (60);

REPLACED BY  
ART 34 AMDT

c) blowing up the green tire carcass with the wrapped fabric overlay to engage a belt structure (16) and a tread (12) to form a completed green tire; and

5 d) blowing up the completed green tire in a curing mold to prestress the reinforcing cords (62) of the fabric underlay (60).

10 18. The method of claim 17 further including the step of circumferentially winding the ribbon of cord-reinforced elastomeric material about the blown-up green carcass such that the edges of the ribbon overlap.

15 19. The method of claim 17 further including the step of circumferentially winding the edges of the ribbon of cord-reinforced elastomeric material about the blown-up carcass such that the edges of the ribbon meet without overlapping.

20 20. The method of claim 17 including the step of circumferentially wrapping the ribbon so that the cords are oriented at an angle of about 0 degrees to about 5 degrees with respect to the equatorial plane of the blown-up green carcass.

REPLACED BY  
ART 34 AMST

sidewall flex area. The wedge inserts in each sidewall, in combination with the ply structure, add rigidity to the sidewalls in the absence of air pressure during runflat operation. But while the high resistance to compression deflection of the inserts provides the necessary resistance to the collapse of the uninflated loaded tire, this method has several drawbacks which include increased tire weight and, especially during runflat operation, heat buildup in the wedge insert reinforcements of the sidewalls. Moreover, during runflat operation, bending stresses tend to be transmitted to the portion of the tread that contacts the ground, the result being that the central portions of the tread tend to buckle upwards from the ground, resulting in compromised vehicle handling as well as reduced runflat tread life as compared to treads that are designed to resist such central upward buckling.

The bending stresses that act upon the ground-contacting portion of the tread during runflat operation derive partly from the bending stresses that are placed upon the reinforced sidewall structures and partly from the adjacent non-ground-contacting portion of the tread. In other words, during runflat operation, the tread buckling forces derive from two essentially perpendicularly disposed sources: lateral or meridional bending stresses originating in the reinforced sidewalls, and circumferentially originating bending stresses which are transmitted from the portions of the tread that are immediately adjacent to the ground-contacting portions of the tread.

REPLACED BY  
ART 34 ANDOT



# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

## PCT

### NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Rule 71.1)

To:

COHN, H.  
The Goodyear Tire and Rubber Comp.  
c/o Robert W. Brown-Dept 823  
1144 East Market Street  
Akron, Ohio 44309-3531  
ETATS-UNIS D'AMERIQUE

Date of mailing  
(day/month/year)

10. 10. 00

Applicant's or agent's file reference  
DN1998090

#### IMPORTANT NOTIFICATION

International application No.  
PCT/US98/14054

International filing date (day/month/year)  
07/07/1998

Priority date (day/month/year)  
07/07/1998

Applicant

THE GOODYEAR TIRE & RUBBER COMPANY et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

RECEIVED

OCT 19 2000

GOODYEAR PATENT  
& TRADEMARK DEPT.

Name and mailing address of the IPEA/

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D-80298 Munich  
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Authorized officer

Dorpema, A

Tel. +49 89 2399-8211



OCT 20 2000

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>DN1998090</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/US98/14054</b>	International filing date (day/month/year) <b>07/07/1998</b>	Priority date (day/month/year) <b>07/07/1998</b>
International Patent Classification (IPC) or national classification and IPC <b>B60C17/00</b>		
Applicant <b>THE GOODYEAR TIRE &amp; RUBBER COMPANY et al.</b>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand <b>09/12/1999</b>	Date of completion of this report <b>10. 10. 00</b>
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer <b>Kieslinger, J</b> Telephone No. +49 89 2399 8871 

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US98/14054

## I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

### Description, pages:

1-3,5-38	as originally filed		
4,4a	as received on	27/07/2000	with letter of 10/07/2000

### Claims, No.:

1-12	as received on	27/07/2000	with letter of 10/07/2000
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### Drawings, sheets:

1/9-9/9	as originally filed
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2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

## IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.
- ☐ paid additional fees under protest.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/US98/14054

- ☐ neither restricted nor paid additional fees.
2. ☒ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with.
- ☒ not complied with for the following reasons:
- see separate sheet**
4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:
- ☒ all parts.
- ☐ the parts relating to claims Nos. .

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims	2,4,5,7-12
	No:	Claims	1,3,6
Inventive step (IS)	Yes:	Claims	10-12
	No:	Claims	1-9
Industrial applicability (IA)	Yes:	Claims	1-12
	No:	Claims	

**2. Citations and explanations**

**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**s separate sheet**

## REF. ITEM IV

The subject-matter of independent claim 1 is already known (see the grounds for this objection). The requisite unity of invention (Rule 13.1 PCT) therefore no longer exists inasmuch as a technical relationship involving one or more of the same or corresponding special technical features in the sense of Rule 13.2 PCT does not exist between the subject-matter of the following groups of claims:

- a) Claims 1 to 6, 8 and 9 (angle of 0 to **20 degrees**, known from D1)
- b) Claims 7 and 10 to 12 (angle of 0 to **5 degrees**).

## REF. ITEM V

### V.1. Prior art

Reference is made to the following documents:

- D1: EP-A-0 778 164 (BRIDGESTONE CORP) 11 June 1997
- D2: US-A-4 262 726 (WELTER THOMAS N H) 21 April 1981 cited in the application
- D3: US-A-4 269 646 (MILLER RICKIE L ET AL) 26 May 1981
- D4: US-A-4 111 249 (MARKOW EDWARD G) 5 September 1978 cited in the application
- D5: WO 88 08373 A (GRUMMAN AEROSPACE CORP) 3 November 1988
- D6: EP-A-0 605 177 (BRIDGESTONE CORP) 6 July 1994

### V.2. Independent claim 1

Document D1 is considered to represent the most relevant state of the art. According to page 3, lines 9 and 49 and the table between lines 40 and 52 on page 4 (example 1) D1 discloses a tire comprising all features of claim 1.

It is true that D1 teaches **preferably** an angle (of the reinforcing cords with respect to the equatorial plane) of greater than or equal to 30° and optimally in a range of 45 to 75°, however, D1 discloses according to its example 1 also an angle of **20°, i.e. an angle in**

the claimed range of 0 to 20 degrees.

Thus the subject-matter of claim 1 lacks novelty as required by Article 33 (2) PCT.

### V.3. Dependent claims 2 to 9

Dependent claims 2 to 9 do not appear to contain features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty or inventive step. These claims suggest only slight changes in the tire of claim 1, which - with regard to D1 to D6 - comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Consequently, the subject-matter of dependent claims 2 to 9 also lacks at least an inventive step.

### V.4. Independent claim 10

Document D1, which is considered to represent the most relevant state of the art, discloses (cf. Fig. 1 and text) a method, from which the subject-matter of claim 10 differs in that

- i) the completed green tire is blown up in a curing mold to prestress the reinforcing cords of the fabric underlay (i.e. feature d) of claim 10), and
- ii) the angle of the reinforcing cords with respect to the equatorial plane is **about 0 to about 5 degrees**.

The problem to be solved by the present invention may be regarded as to improve high speed characteristics.

It is true that the feature i) of claim 10 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT), since this feature i) is described in document D2 (see e.g. col. 3, lines 52, 53 and col. 4, lines 20 to 35) as providing the same advantages as in the present application. The skilled person would therefore regard it as a normal option to include this feature in the method known from document D1 in order to solve the problem posed.

However, the combination of all features including feature ii) of independent claim 10 is neither known from, nor rendered obvious by, the available prior art.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/US98/14054

Therefore, the solution to the above mentioned problem proposed in claim 10 of the present application is considered as involving an inventive step (Article 33(3) PCT).

**V.5. Dependent claims 11 and 12**

Claims 11 and 12 are dependent on claim 10 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

**REF. ITEM VIII**

VIII.1. The vague and imprecise statement **"...within the spirit..."** in the description on page 38 implies that the subject-matter for which protection is sought may be different to that defined by the claims, thereby resulting in lack of clarity (Article 6 PCT) when used to interpret them (see also the PCT Guidelines, III-4.3a).

sidewall flex area. The wedge inserts in each sidewall, in combination with the ply structure, add rigidity to the sidewalls in the absence of air pressure during runflat operation. But while the high resistance to compression deflection of the inserts provides the necessary resistance to the collapse of the uninflated loaded tire, this method has several drawbacks which include increased tire weight and, especially during runflat operation, heat buildup in the wedge insert reinforcements of the sidewalls. Moreover, during runflat operation, bending stresses tend to be transmitted to the portion of the tread that contacts the ground, the result being that the central portions of the tread tend to buckle upwards from the ground, resulting in compromised vehicle handling as well as reduced runflat tread life as compared to treads that are designed to resist such central upward buckling.

The bending stresses that act upon the ground-contacting portion of the tread during runflat operation derive partly from the bending stresses that are placed upon the reinforced sidewall structures and partly from the adjacent non-ground-contacting portion of the tread. In other words, during runflat operation, the tread buckling forces derive from two essentially perpendicularly disposed sources: lateral or meridional bending stresses originating in the reinforced sidewalls, and circumferentially originating bending stresses which are transmitted from the portions of the tread that are immediately adjacent to the



ground-contacting portions of the tread.

An example of reducing the effect of the bending stresses during runflat operation is set forth in EP  
5 0,778,164, which discloses a tire with run-flat durability that has an auxiliary layer between the carcass and the belt layer. The auxiliary layer includes cords that intersect the central equatorial plane at an angle of greater than or equal to  $30^\circ$ .

What is claimed:

1. A pneumatic radial ply runflat tire (10) having a tread (12), a carcass (25) with two sidewalls (18,19) and two inextensible annular beads (26) and a radial ply  
5 structure (37) of one or more radial plies (30,40) and one or more inserts (46,48), and a belt structure (16) located between the tread and the radial ply structure, the runflat tire characterized by:

a fabric underlay (60) deployed between the belt  
10 structure (16) and the radial ply structure (37) for supporting tensile loads during both normal-inflated and runflat operating conditions, the fabric underlay containing high-modulus reinforcing cords (62) being aligned about 0 degrees to 20 degrees with respect to the equatorial plane  
15 of the tire.

2. The tire (10) of claim 1 in which the fabric underlay (60) is disposed radially inward of the belt structure (16) and having opposing marginal edges (27,28) which extend laterally beyond lateral edges of the belt  
20 structure.

3. The tire (10) of claim 1 in which the high-modulus reinforcing cords (62) of the fabric underlay (60) are made of high-modulus material selected from the group consisting essentially of polyester, nylon, rayon, aramid and glass.

4. The tire (10) of claim 1 in which the fabric underlay (60) is located on the tensile side of the neutral bending axis of the combined belt structure (16), fabric underlay (60) and ply structure (37).

5 5. The tire (10) of claim 4 in which the circumferentially oriented cords (62) of the fabric underlay (60) are prestressed in tension during manufacturing of the tire.

6. The tire (10) of claim 1 in which the fabric  
10 underlay (60) separates the belt structure (16) from the ply structure (37).

7. The tire (10) of claim 1 in which the reinforcing  
cords (62) of the fabric underlay (60) are most preferably  
oriented at an angle of 0 degrees with respect to the  
15 equatorial plane of the tire.

8. The tire (10) of claim 1 in which a fabric overlay  
(540) is disposed between the belt structure (16) and the  
tread (12).

9. The tire (10) of claim 1 wherein at least one or  
20 more of radial plies (30,40) is reinforced by essentially  
inextensible cords.

10. A method of constructing a radial ply runflat tire  
(10) by the steps of:

a) forming a blown-up green tire carcass (25);

b) circumferentially wrapping a ribbon of cord-reinforced elastomeric material upon the blown-up green tire carcass to form the fabric underlay (60) so that the cords of the elastomeric material are oriented at an angle of about 0 degrees to about 5 degrees with respect to the equatorial plane of the blown-up green carcass;

c) blowing up the green tire carcass with the wrapped fabric overlay to engage a belt structure (16) and a tread (12) to form a completed green tire; and

d) blowing up the completed green tire in a curing mold to prestress the reinforcing cords (62) of the fabric underlay (60).

11. The method of claim 10 further including the step of circumferentially winding the ribbon of cord-reinforced elastomeric material about the blown-up green carcass such that the edges of the ribbon overlap.

12. The method of claim 10 further including the step of circumferentially winding the edges of the ribbon of cord-reinforced elastomeric material about the blown-up carcass such that the edges of the ribbon meet without overlapping.

# PATENT COOPERATION TREATY

RECEIVED  
MAR 16 1999

GOODYEAR PATENT  
& TRADEMARK DEPT.

**PCT**

From the INTERNATIONAL SEARCHING AUTHORITY

To:

The Goodyear Tire and Rubber Comp.  
c/o Robert W. Brown-Dept 823  
Attn. COHN, H.  
1144 East Market Street  
Akron, Ohio 44309-3531  
UNITED STATES OF AMERICA

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT  
OR THE DECLARATION

(PCT Rule 44.1)

<p>Applicant's or agent's file reference <b>DN1998090</b></p>	<p>Date of mailing (day/month/year) <b>03/03/1999</b></p>
<p>International application No. <b>PCT/US 98/ 14054</b></p>	<p>International filing date (day/month/year) <b>07/07/1998</b></p>
<p>Applicant <b>THE GOODYEAR TIRE &amp; RUBBER COMPANY et al.</b></p>	

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

**Filing of amendments and statement under Article 19**

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

**When?** The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

**Where?** Directly to the International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland  
Facsimile No.: (41-22) 740.14.35

**For more detailed instructions,** see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicants's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Sandrine Polenzani

KMS

## NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

### INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

#### What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

#### When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

#### Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

#### How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

#### What documents must/may accompany the amendments?

##### Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

## NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:  
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:  
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:  
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or  
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:  
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

### "Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

**It must be in the language in which the international application is to be published.**

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

### Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

### Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>DN1998090</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/US 98/14054</b>	International filing date (day/month/year) <b>07/07/1998</b>	(Earliest) Priority Date (day/month/year)
Applicant <b>THE GOODYEAR TIRE &amp; RUBBER COMPANY et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (see Box I).

2. ☐ Unity of invention is lacking (see Box II).

3. ☐ The international application contains disclosure of a **nucleotide and/or amino acid sequence listing** and the international search was carried out on the basis of the sequence listing

☐ filed with the international application.

☐ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ Transcribed by this Authority

4. With regard to the title, ☒ the text is approved as submitted by the applicant

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International Search Report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is:

Figure No. 3 ☒ as suggested by the applicant.

☐ None of the figures.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.



## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/14054

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B60C17/00 B60C9/18 B60C9/22 B29D30/08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B60C B29D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 778 164 A (BRIDGESTONE CORP) 11 June 1997	1, 3, 10-12
Y	see page 2, line 40 - page 3, line 11; claim 1; figures	1-6, 8-14
Y	US 4 262 726 A (WELTER THOMAS N H) 21 April 1981 cited in the application see column 1, line 64 - column 2, line 62; claims; figures	1-6, 8-14
X	US 4 269 646 A (MILLER RICKIE L ET AL) 26 May 1981 see claims	17
A	US 4 111 249 A (MARKOW EDWARD G) 5 September 1978 cited in the application	1-10

-/--

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

25 February 1999

Date of mailing of the international search report

03/03/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer:

Baradat, J-L

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/14054

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 88 08373 A (GRUMMAN AEROSPACE CORP) 3 November 1988	1-10
A	EP 0 605 177 A (BRIDGESTONE CORP) 6 July 1994 see claims	1,15

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/14054

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 0778164	A	11-06-1997	WO	9701452 A	16-01-1997
US 4262726	A	21-04-1981	EP	0016114 A	01-10-1980
			JP	55500744 T	09-10-1980
			WO	8000069 A	24-01-1980
US 4269646	A	26-05-1981	AU	514919 B	05-03-1981
			AU	3371678 A	06-09-1979
			BR	7801630 A	24-10-1978
			CA	1082863 A	05-08-1980
			DE	2813702 A	12-10-1978
			FR	2385518 A	27-10-1978
			GB	1601100 A	21-10-1981
			LU	79245 A	29-06-1978
US 4111249	A	05-09-1978	NONE		
WO 8808373	A	03-11-1988	US	4794966 A	03-01-1989
			EP	0310650 A	12-04-1989
EP 0605177	A	06-07-1994	JP	6191243 A	12-07-1994
			AU	653112 B	15-09-1994
			AU	5235693 A	14-07-1994
			DE	69308280 D	03-04-1997
			DE	69308280 T	17-07-1997
			ES	2100480 T	16-06-1997
			US	5427176 A	27-06-1995

What is claimed:

1. A pneumatic radial ply runflat tire having a tread,  
a carcass with two sidewalls and two inextensible annular  
beads and a radial ply structure of one or more radial plies  
5 and one or more inserts, and a belt structure located  
between the tread and the radial ply structure, the runflat  
tire characterized by:

a fabric underlay deployed between the belt structure  
and the radial ply structure for supporting tensile loads  
10 during both normal-inflated and runflat operating  
conditions, the fabric underlay containing high-modulus  
reinforcing cords being aligned from about 0 degrees to less  
than 20 degrees with respect to the equatorial plane of the  
tire.

15 2. The tire of claim 1 in which the fabric underlay is  
disposed radially inward of the belt structure and having  
opposing marginal edges which extend laterally beyond  
lateral edges of the belt structure.

3. The tire of claim 1 in which the high-modulus  
20 reinforcing cords of the fabric underlay are made of high-  
modulus material selected from the group consisting  
essentially of polyester, nylon, rayon, aramid and glass.

4. The tire of claim 1 in which the fabric underlay is  
located on the tensile side of the neutral bending axis of

the combined belt structure, fabric underlay and ply structure.

5        5. The tire of claim 4 in which the circumferentially oriented cords of the fabric underlay are prestressed in tension during manufacturing of the tire.

6. The tire of claim 1 in which the fabric underlay separates the belt structure from the ply structure.

7. The tire of claim 1 in which the reinforcing cords of the fabric underlay are most preferably oriented at an  
10 angle of 0 degrees with respect to the equatorial plane of the tire.

8. The tire of claim 1 in which a fabric overlay is disposed between the belt structure and the tread.

9. The tire of claim 1 wherein at least one or more of  
15 radial plies is reinforced by essentially inextensible cords.

10. A method of constructing a radial ply runflat tire by the steps of:

- a) forming a blown-up green tire carcass;
- 20        b) circumferentially wrapping a ribbon of cord-reinforced elastomeric material upon the blown-up green tire carcass to form the fabric underlay so that the cords of the elastomeric material are oriented at an angle of about 0 degrees to about 5 degrees with respect to the equatorial  
25 plane of the blown-up green carcass;

c) blowing up the green tire carcass with the wrapped fabric overlay to engage a belt structure and a tread to form a completed green tire; and

d) blowing up the completed green tire in a curing mold  
5 to prestress the reinforcing cords of the fabric underlay.

11. The method of claim 10 further including the step of circumferentially winding the ribbon of cord-reinforced elastomeric material about the blown-up green carcass such that the edges of the ribbon overlap.

10 12. The method of claim 10 further including the step of circumferentially winding the edges of the ribbon of cord-reinforced elastomeric material about the blown-up carcass such that the edges of the ribbon meet without overlapping.

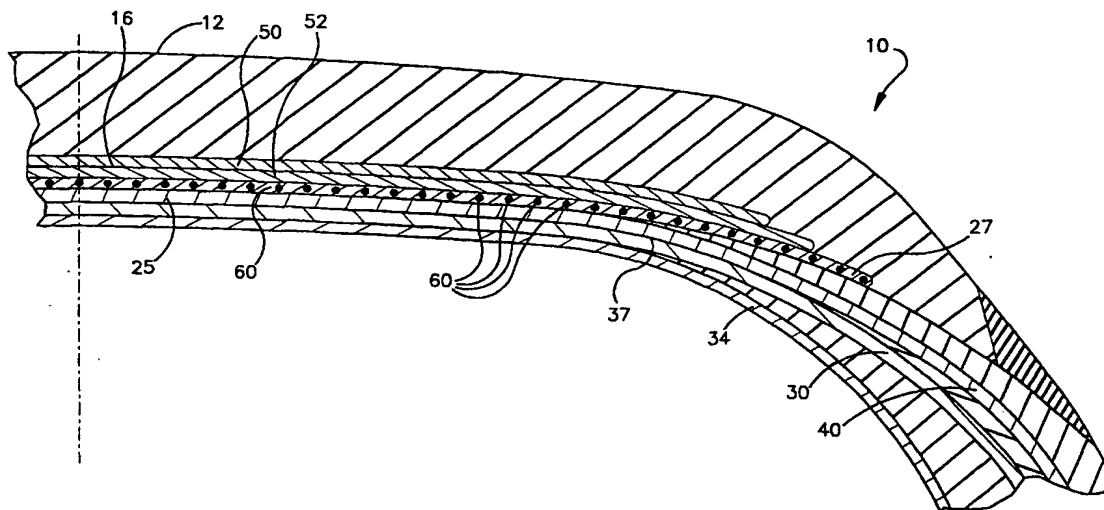
WIP

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US98/14054 <b>(22) International Filing Date:</b> 7 July 1998 (07.07.98) <b>(71) Applicant (for all designated States except US):</b> THE GOODYEAR TIRE & RUBBER COMPANY [US/US]; 1144 East Market Street, Akron, OH 44316-0001 (US). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> ROESGEN, Alain, Emile, François [LU/LU]; 11, rue Alfred de Musset, L-2175 Luxembourg (LU). <b>(74) Agent:</b> COHN, Howard, M.; c/o Brown, Robert, W., Dept. 823, The Goodyear Tire & Rubber Company, 1144 East Market Street, Akron, OH 44309-3531 (US).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** FABRIC UNDERLAY FOR IMPROVING TREAD CIRCUMFERENTIAL AND MERIDIONAL RIGIDITY**(57) Abstract**

A pneumatic radial ply passenger tire (10) having a tread (12), a carcass (25) with two sidewalls (18, 19), two or more radial plies (30, 40), two annular beads (26), a belt structure (16) located radially between the tread and the radial ply structure (37), and a fabric underlay (60) deployed between the carcass and the belt structure. The underlay (60) contains circumferentially aligned high-modulus fibers or cords (62) which, in combination with metal belt structure (16), induces compressive prestresses in the belt structure, thereby increasing the rigidity of the belt structure and overlying tread. In particular, fabric underlay (60) induces increased resistance of the tread to upward buckling of its center during runflat operation, and also retards the formation of standing waves in the tread (12) and sidewalls (18, 19) during normal-inflated high-speed operation.

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/14054

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 6    B60C17/00    B60C9/18    B60C9/22    B29D30/08		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 6    B60C    B29D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 778 164 A (BRIDGESTONE CORP) 11 June 1997	1,3, 10-12
Y	see page 2, line 40 - page 3, line 11; claim 1; figures	1-6,8-14
Y	--- US 4 262 726 A (WELTER THOMAS N H) 21 April 1981 cited in the application see column 1, line 64 - column 2, line 62; claims; figures	1-6,8-14
X	--- US 4 269 646 A (MILLER RICKIE L ET AL) 26 May 1981 see claims	17
A	--- US 4 111 249 A (MARKOW EDWARD G) 5 September 1978 cited in the application ---	1-10
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<div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.</span> <span><input checked="" type="checkbox"/> Patent family members are listed in annex.</span> </div>		
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Date of the actual completion of the international search	Date of mailing of the international search report	
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer  Baradat, J-L	

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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